



IN THE CLAIMS:

1-20. (CANCELLED)

1 21. (PREVIOUSLY PRESENTED) A method for use in a negotiated graceful takeover
2 in a computer cluster having a first and second computer, the method comprising the
3 steps of:

4 detecting an operational fault at the first computer;

5 requesting, from the first computer, in response to the operational fault, that the
6 second computer take over for the first computer;

7 requesting, from the second computer, that the first computer shut down;

8 completing service requests at the first computer pending at the time the first
9 computer was requested to shut down;

10 transferring responsibilities of the first computer to the second computer; and

11 shutting down the first computer.

1 22. (PREVIOUSLY PRESENTED) The method as in claim 21, further comprising:
2 monitoring, from the second computer, for any operational faults at the first computer.

1 23. (PREVIOUSLY PRESENTED) The method as in claim 21, further comprising: di-
2 agnosing, at the first computer, the operational fault of the first computer.

1 24. (PREVIOUSLY PRESENTED) The method as in claim 21, further comprising: re-
2 requesting, from the first computer, that the second computer diagnose the operational fault
3 of the first computer.

1 25. (PREVIOUSLY PRESENTED) The method as in claim 21, further comprising: di-
2 agnosing, at the second computer, the operational fault of the first computer.

1 26. (PREVIOUSLY PRESENTED) The method as in claim 21, further comprising:
2 sending, from the first computer to the second computer, an indication of the type of op-
3 erational fault detected at the first computer.

1 27. (PREVIOUSLY PRESENTED) The method as in claim 21, further comprising: de-
2 termining, at the second computer, if the second computer can take over for the first
3 computer before requesting the shut down of the first computer.

1 28. (PREVIOUSLY PRESENTED) The method as in claim 21, further comprising: re-
2 fusing further service requests at the first computer after the first computer was requested
3 to shut down.

1 29. (PREVIOUSLY PRESENTED) The method as in claim 21, further comprising:
2 transferring access of a storage device for the first computer to the second computer.

1 30. (PREVIOUSLY PRESENTED) The method as in claim 21, further comprising: as-
2 serting, at the second computer, disk reservations of disks of the first computer.

- 1 31. (PREVIOUSLY PRESENTED) The method as in claim 21, further comprising: re-
2 routing file service requests from the first computer to the second computer.
- 1 32. (PREVIOUSLY PRESENTED) The method as in claim 21, further comprising: ac-
2 tivating, at the second computer, network interfaces and network addresses that replicate
3 those of the first computer.
- 1 33. (PREVIOUSLY PRESENTED) The method as in claim 21, further comprising: ini-
2 tiating a countdown timer subsequent to the shut down request from the second computer.
- 1 34. (PREVIOUSLY PRESENTED) The method as in claim 33, further comprising:
2 forcing the first computer to shut down in the event the first computer is still operating at
3 the expiration of the countdown timer.
- 1 35. (PREVIOUSLY PRESENTED) The method as in claim 21, further comprising: de-
2 tecting, at the second computer, the shut down of the first computer by the absence of a
3 periodic heartbeat signal.
- 1 36. (PREVIOUSLY PRESENTED) The method as in claim 21, further comprising:
2 storing, at the first computer, state information of the first computer prior to shutting
3 down.
- 1 37. (PREVIOUSLY PRESENTED) The method as in claim 21, further comprising:
2 sending periodic requests from the second computer to the first computer to remain shut
3 down, after the first computer has shut down.

1 38. (PREVIOUSLY PRESENTED) The method as in claim 21, further comprising: re-
2 requesting, from the first computer, that the second computer restore responsibilities of the
3 first computer to the first computer.

1 39. (PREVIOUSLY PRESENTED) The method as in claim 21, further comprising: re-
2 storing responsibilities of the first computer to the first computer upon restart of the first
3 computer.

1 40. (PREVIOUSLY PRESENTED) The method as in claim 21, further comprising: re-
2 storing responsibilities of the first computer to the first computer upon curing the opera-
3 tional fault of the first computer.

1 41. (PREVIOUSLY PRESENTED) The method as in claim 21, further comprising: us-
2 ing the first and second computers as a file servers.

1 42. (PREVIOUSLY PRESENTED) A storage system capable of performing a negoti-
2 ated graceful takeover, the storage system comprising:

3 a first computer;

4 a second computer;

5 a first processor for the first computer to

6 i) detect an operational fault at the first computer, and

7 ii) request, in response to the operational fault, that the second computer
8 take over for the first computer; and

9 a second processor for the second computer to

- 10 i) request that the first computer shut down,
- 11 ii) allow the first computer to complete service requests pending at the
- 12 time the first computer was requested to shut down,
- 13 iii) take over any responsibilities of the first computer, and
- 14 iv) allow the first computer to shut down.

1 43. (PREVIOUSLY PRESENTED) The storage system as in claim 42, further compris-
2 ing: a failover monitor to monitor for any operational faults at the first computer.

1 44. (PREVIOUSLY PRESENTED) The storage system as in claim 42, further compris-
2 ing: the first processor to diagnose the operational fault of the first computer.

1 45. (PREVIOUSLY PRESENTED) The storage system as in claim 42, further compris-
2 ing: the first processor to request that the second computer diagnose the operational fault
3 of the first computer.

1 46. (PREVIOUSLY PRESENTED) The storage system as in claim 42, further compris-
2 ing: the second processor to diagnose the operational fault of the first computer.

1 47. (PREVIOUSLY PRESENTED) The storage system as in claim 42, further compris-
2 ing: the first processor to send, to the second computer, an indication of the type of opera-
3 tional fault detected at the first computer.

1 48. (PREVIOUSLY PRESENTED) The storage system as in claim 42, further compris-
2 ing: the second processor to determine if the second computer can take over for the first
3 computer before requesting the shut down of the first computer.

1 49. (PREVIOUSLY PRESENTED) The storage system as in claim 42, further compris-
2 ing: the first processor to refuse further service requests at the first computer after the
3 first computer was requested to shut down.

1 50. (PREVIOUSLY PRESENTED) The storage system as in claim 42, further compris-
2 ing:

3 a storage device for the first computer; and

4 an interconnect to transfer access of the storage device for the first computer to
5 the second computer.

1 51. (PREVIOUSLY PRESENTED) The storage system as in claim 42, further compris-
2 ing: disks of the first computer, the disks to be reserved by the second computer while the
3 first computer is shut down.

1 52. (PREVIOUSLY PRESENTED) The storage system as in claim 42, further compris-
2 ing: an interconnect to reroute file service requests from the first computer to the second
3 computer.

1 53. (PREVIOUSLY PRESENTED) The storage system as in claim 42, further compris-
2 ing:

3 network interfaces at the first computer;

4 network addresses at the first computer;

5 network interfaces at the second computer that replicate the network interfaces of
6 the first computer; and

7 network addresses at the second computer that replicate the network interfaces of
8 the first computer, the network interfaces and addresses at the second computer that rep-
9 licate the network interfaces and addresses of the first computer to be activated by the
10 second computer while the first computer is shut down.

1 54. (PREVIOUSLY PRESENTED) The storage system as in claim 42, further compris-
2 ing: a countdown timer, the countdown timer to be initiated subsequent to the shut down
3 request from the second computer.

1 55. (PREVIOUSLY PRESENTED) The storage system as in claim 54, further compris-
2 ing: an interconnect to force the first computer to shut down in the event the first com-
3 puter is still operating at the expiration of the countdown timer.

1 56. (PREVIOUSLY PRESENTED) The storage system as in claim 42, further compris-
2 ing: an interconnect at the second computer to detect the shut down of the first computer
3 by the absence of a periodic heartbeat signal.

1 57. (PREVIOUSLY PRESENTED) The storage system as in claim 42, further compris-
2 ing: persistent memory at the first computer to store state information of the first com-
3 puter prior to shutting down.

1 58. (PREVIOUSLY PRESENTED) The storage system as in claim 42, further compris-
2 ing: an interconnect at the second computer to send periodic requests to the first computer
3 to remain shut down, after the first computer has shut down.

1 59. (PREVIOUSLY PRESENTED) The storage system as in claim 42, further compris-
2 ing: the first processor to request that the second computer restore responsibilities of the
3 first computer to the first computer.

1 60. (PREVIOUSLY PRESENTED) The storage system as in claim 42, further compris-
2 ing: an interconnect to restore responsibilities of the first computer to the first computer
3 upon restart of the first computer.

1 61. (PREVIOUSLY PRESENTED) The storage system as in claim 42, further compris-
2 ing: an interconnect to restore responsibilities of the first computer to the first computer
3 upon curing the operational fault of the first computer.

1 62. (PREVIOUSLY PRESENTED) The storage system as in claim 42, further compris-
2 ing: the first and second computers are file servers.

1 63. (PREVIOUSLY PRESENTED) A storage system capable of performing a negoti-
2 ated graceful takeover, the storage system comprising:

3 a first computer;

4 a second computer;

5 means for detecting an operational fault at the first computer;

6 means for requesting, from the first computer, in response to the operational fault,
7 that the second computer take over for the first computer;

8 means for requesting, from the second computer, that the first computer shut
9 down;

10 means for completing service requests at the first computer pending at the time
11 the first computer was requested to shut down;

12 means for transferring responsibilities of the first computer to the second com-
13 puter; and

14 means for shutting down the first computer.

1 64. (PREVIOUSLY PRESENTED) A computer readable media, comprising: the com-
2 puter readable media containing instructions for execution in a processor for the method
3 of,

4 detecting an operational fault at a first computer;

5 requesting, from the first computer, in response to the operational fault, that a
6 second computer take over for the first computer;

7 requesting, from the second computer, that the first computer shut down;

8 completing service requests at the first computer pending at the time the first
9 computer was requested to shut down;

10 transferring responsibilities of the first computer to the second computer; and

11 shutting down the first computer.

1 65. (CANCELLED)